Headquarters U.S. Air Force

Integrity - Service - Excellence

Air Force Unmanned Aerial System (UAS) Flight Plan 2009-2047

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AF ISR Transformation

- **New challenges, new adversaries mandate new role for ISR**
  - **Collectively necessitated *AF ISR Transformation***
  - **Expanded role and reach of AF ISR**
  - **Requires changing the culture regarding ISR**
- **Approach:**
  - **ORGANIZATION:** ***Organize AF ISR as a holistic AF-wide enterprise to optimize presentation of ISR capabilities to service, joint, & national users***
  - **PERSONNEL:** ***Develop ISR career paths to build viable "bench" of AF ISR senior leaders to meet 21st Century demands***
  - **CAPABILITY:** ***Plan, guide, and orchestrate AF/ISR from a capability-based perspective as a consolidated functional area***

Codifying AF ISR for the 21st Century

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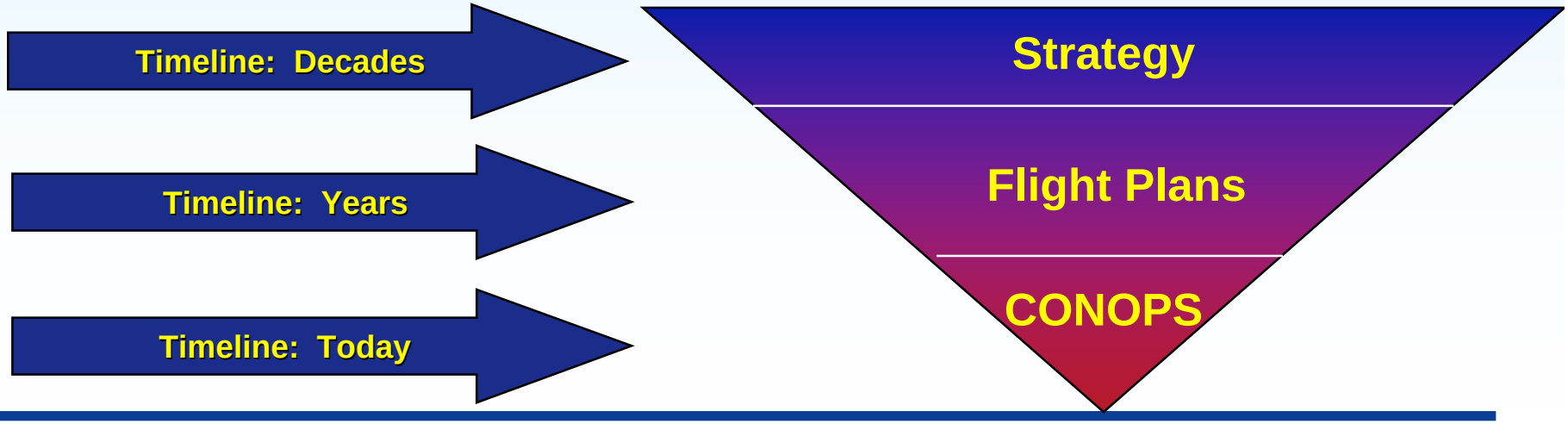
1) AF ISR Strategy: AF ISR's long-range plan that provides overall guidance and philosophy
2) AF ISR Flight Plan: Identifies options to resource the AF ISR strategy
3) AF UAS Flight Plan: Action plan to guide AF UAS development
4) ISR CONOPs: Describes how we envision integrating and optimizing ISR day-to-day operations



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What do UAS's Bring to Operations?

- Persistence—ability to loiter over a target for long time periods for ISR and/or opportunity to strike enemy target
- Undetected penetration / operation
- Operation in dangerous environments
- Can be operated remotely, so fewer personnel in combat zones—projects power without projecting vulnerability
- Integrates "find, fix, finish" sensor and shooter capabilities on one platform

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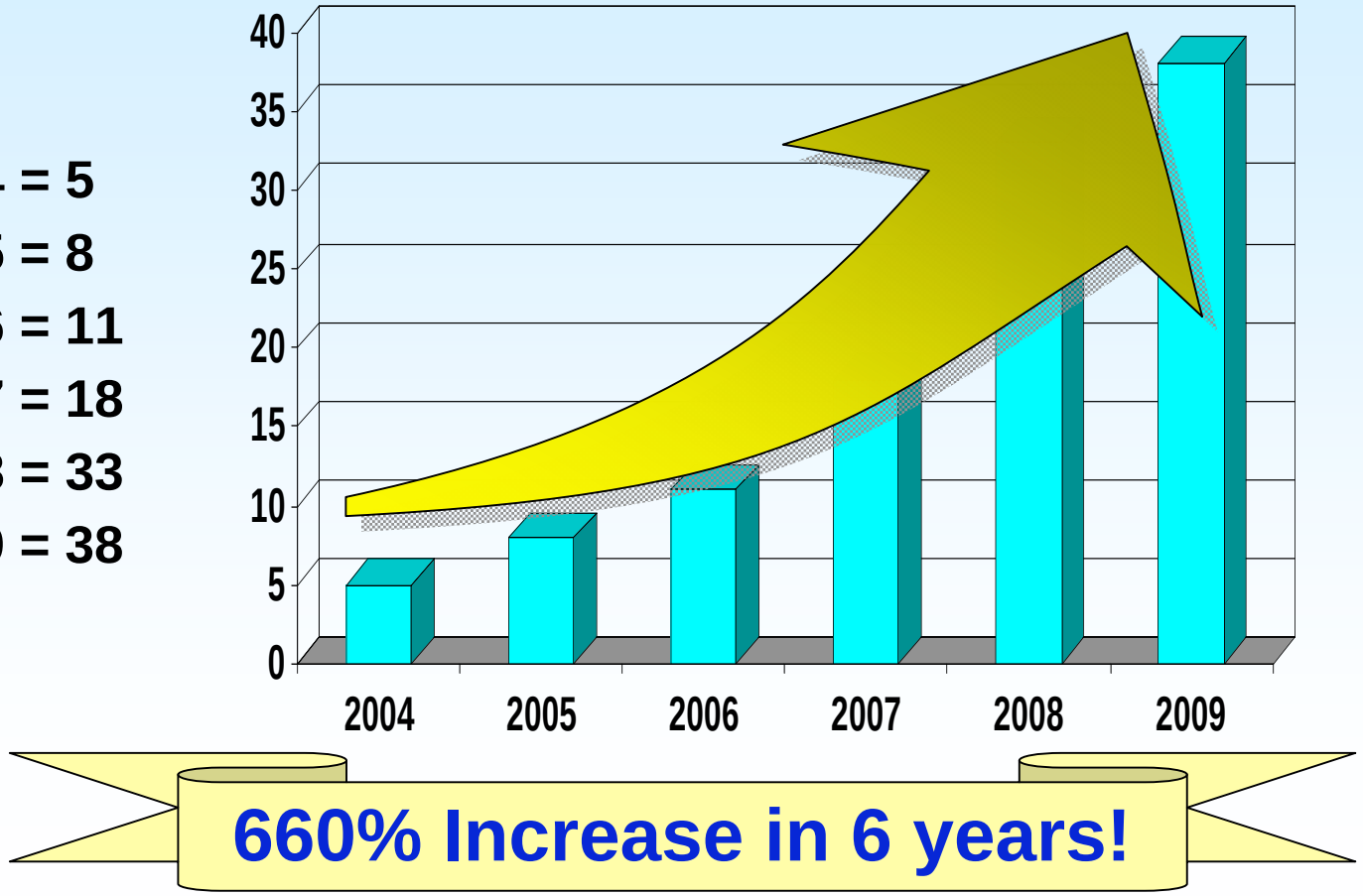
Result: High Demand Asset

Growth in Air Force medium-altitude MQ-1 Predator and MQ-9 Reaper Combat Air Patrols

- 2004 = 5
- 2005 = 8
- 2006 = 11
- 2007 = 18
- 2008 = 33
- 2009 = 38



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USAF UAS Vision: What We Believe

…A Joint approach to:

Get the <u>most</u> out of UAS to <u>increase</u> joint warfighting capability, while promoting service interdependency and the wisest use of tax dollars

Requires:

- **Optimal Joint Concept of Operations (CONOPS)**
- **Airspace Control Resulting in Safe/Effective UAS Operations**
- **Air Defense Architecture to Achieve Security w/o Fratricide**
- **Increased Acquisition Effectiveness, Efficiency, Standardization**

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AF UAS Flight Plan: Vision for the future

An Air Force with…

- Unmanned aircraft that are fully integrated with manned aircraft across the full range of military operations
- UAS that use automated control and modular "plug-and-play" payloads to maximize combat capability, flexibility and efficiency
- Joint UAS solutions and teaming
- An informed industry and academia – knowing where we are going and what technologies to invest in

Capabilities-based Air Force UAS vision thru 2047: Defines DOTMLPF way forward

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AF UAS Flight Plan 2009-2047

Colonel Eric Mathewson
AF UAS Task Force

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Assumptions

- Manned and unmanned systems must be integrated to increase capability across the full range of military operations for the Joint Force
- UAS compelling where the human is a limitation to mission success
- Automation is key to increasing effects, while potentially reducing cost, forward footprint and risk
- The desired effect is a product of the “integrated system” (payload, network, and PED); and less the particular platform (truck)
- Modular systems with standardized interfaces enhance adaptability, sustainability and reduce cost
- Robust, agile, redundant C2 enables supervisory control (“man on the loop”)
- DOTMLPF-P solutions are linked and must be synchronized

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Autonomy

Conventional Harbor

- 4 operators per crane
- Manpower-centric system
  - Legacy system
  - Manpower dependant
  - Manual Operation

"Multi-Crane Control"

- 1 operator per 6 cranes
  - 24x increase in efficiency
- Tech-centric system
  - Multi-crane Control
  - Automation (cranes and AGV)
    - DGPS
    - Algorithms

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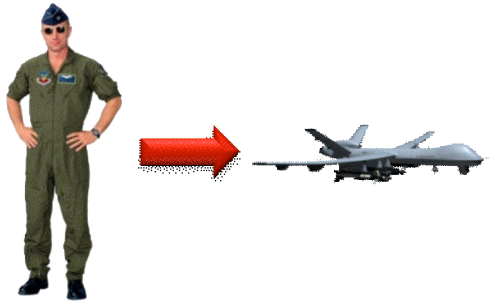
Autonomy – Multi-Aircraft Control Potential Manpower Savings

2011
(Current system)

- 50 CAPs
  - 50 MQ-9 CAPs
  - + 7 a/c in constant transit
- 10 pilots per CAP
  - 500 pilots required
  - + 70 pilots to transit a/c

570 Total Pilots

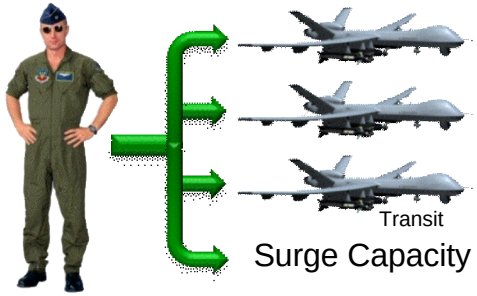


2012
(MAC)

- 50 CAPs
  - 50 MQ-9 CAPs
  - 2 CAPs per MAC GCS
  - 1 transit per MAC GCS
- 5 pilots per CAP
  - 250 Pilots required
  - + 0 to transit aircraft

250 Total Pilots

56% Manpower Savings



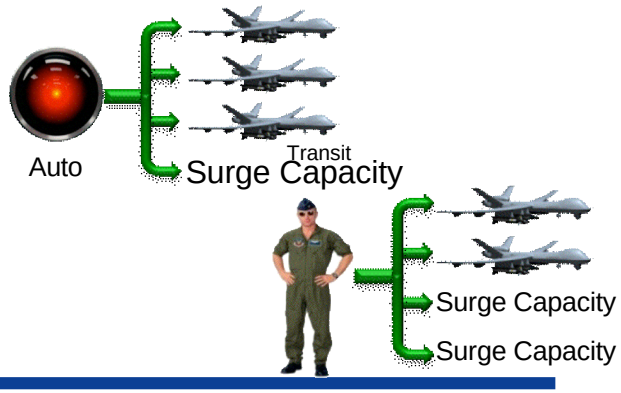
MAC = 1 pilot can fly up to 4 a/c

TBD
(MAC + 50% auto)

- 50 CAPs
  - 50 MQ-9 CAPs on orbit
- 25 CAPs automated
- 25 CAPs in MAC (5 pilots/CAP)
  - 125 pilots required
  - + 25 auto-msn monitor pilots
  - + 0 to transit aircraft

150 Total Pilots

64% Manpower Savings



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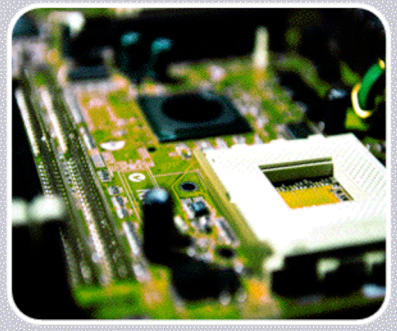
Modularity

Effective

B-52

- Standard Interfaces
- Variable / Tailorable armament set
- JFC Mission Flexibility
  - Conventional/nuclear
  - Stand-off strike, CAS

Affordable



PCs

- Standard interface/bus
- Swappable components
- Promotes vender competition
- Drives down price, improves quality, allows for tailorability
- $399 PCs are reality

Flexible

C-130

- One platform/truck
- Supports multiple missions
- Swappable modules

AMC-X CONCEPT CAPABILITIES STUDY

Common components, similar shape, and same production line

Enabling the "Global" in "Global Vigilance, Reach and Power!"

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How do we get there?

- Methodology
  - Identified where we are today
  - Examined future scenarios and desired capabilities
  - From that future perspective identified actions to get there from today
  - Matched compelling requirements to UAS capabilities aligned with AF Core Functions
  - Identified and sequenced actions addressing not only materiel solutions, but also the doctrine, organization, training, facilities and policy

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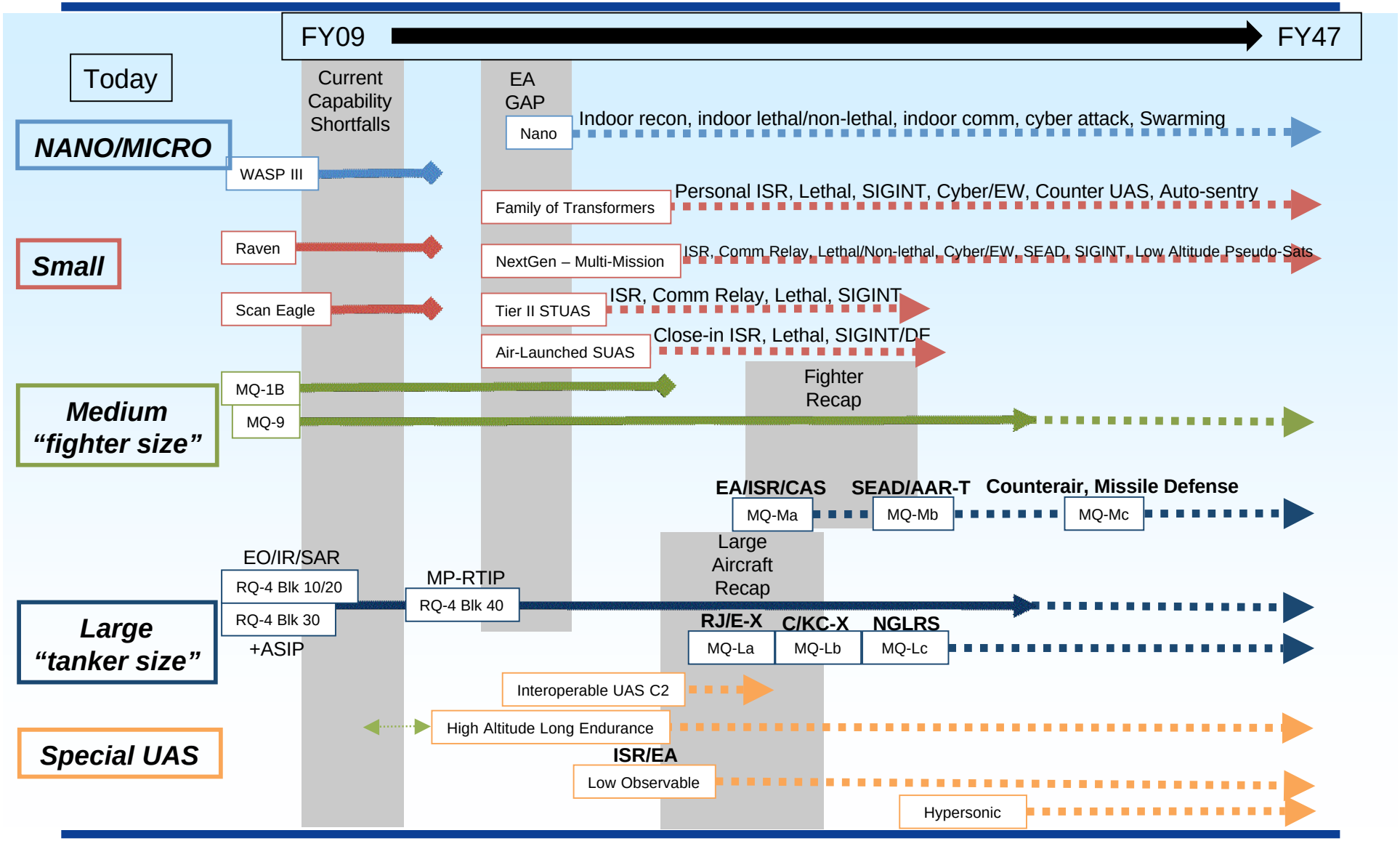
AF UAS Flight Plan:
Mission sets for UAS



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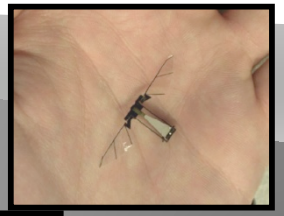
SUAS "Family of Systems"

Nano
Navigate / communicate inside buildings



Nano

Bio-Mechanicals
- Indoor Reconnaissance
  - Indoor Lethal/Non-lethal
  - Indoor Comm
- Cyber attack
- Swarming

Micro
Close-in reconnaissance & situational awareness

Wasp III

"SUAS Family of Transformers"
- Personal ISR
  - Lethal
  - SIGINT
  - Cyber/EW
  - Counter-UAV
  - AutoSentries

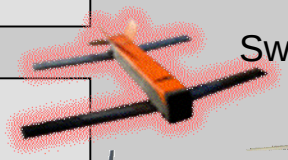
Lite Machine's Conceptual SUAS

Irregular Warfare

Man-portable
- ISR
- Time-Sensitive
- Lethal

Raven B

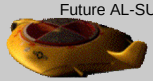
Increasing across all mission sets



Switchblade SUAS
Technical Demonstration

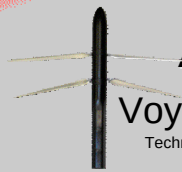
Family of Expendables
- Close-In ISR
- Expendable Jammers
- Lethal
- Counter Air
- Precision Clandestine Resupply
- Cyber attack

Artist Conception Future AL-SUAS



Air-Launched
- Close-in ISR
- Lethal
- SIGINT/DF

Finder SUAS



Anti-Access Support

Voyeur SUAS
Technical Demonstration

Next Gen Multi-Mission
- ISR
- Communications Relay
- Lethal / Non-lethal
- Electronic/Cyber Attack/SEAD
- SIGINT/Low Altitude Pseudo-Sats
- = New Mission areas

Multi-Mission
- ISR
- Force protection
- FID

Scan Eagle

Tier II Joint
- ISR
- Comm Relay
- Lethal
- SIGINT

GT Aero Conceptual Bandit SUAS

Now → Future

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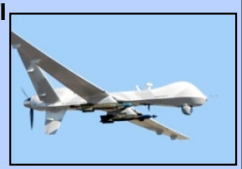
Medium "System"

MQ-1
- Collection – SIGINT/FMV
- CAS

MQ-9
- Collection – SIGINT/FMV
- CAS

MQ-Xa

MQ-9
- Collection
  - SIGINT/FMV
  - Wide Area Airborne ISR
  - SAR/GMTI
- CAS



Modular Payloads
- EW
- ISR
- CAS
- Comm Relay
- Collection
- Dissemination
- Specialized ISR
- AAR-R

MQ-Xb

Modular Payloads
- EW/ISR
- CAS
- Comm Relay
- Collection
- Dissemination
- Specialized ISR
- AAR-R&T
- SEAD
- Air Interdiction
- Counter Air
- CSAR
- Missile Defense
- Strategic Attack

MQ-Xc

Modular Payloads
- EW
- ISR
- CAS
- Comm Relay
- Collection
- Dissemination
- Specialized ISR
- AAR-T
- SEAD
- Air Interdiction
- Aeromedical Evacuation
- Personnel Recovery

Now → Future

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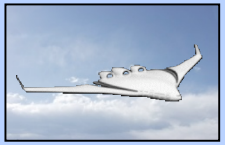
Large "System"

RQ-4 (Blk10)
- Collection – ISR
  - Basic SAR
  - Basic EO/IR

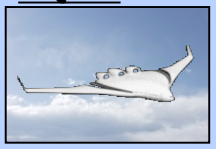
RQ-4 (Blk 20/30/40)
- **Collection:**
- *Block 20*
  - Enh SAR
  - Enh EO/IR
- *Block 30*
  - Adv SIGINT
- *Block 40*
  - MP-RTIP Radar
  - GMTI and concurrent SAR
  - High Range Resolution
  - No EO/IR or SIGINT

MQ-La



Modular Payloads
- EW
- ISR
- Command and Control
- Airborne Moving Target Indicator
- Ground Moving Target Indicator
- Information Integration
- AAR-R

MQ-Lb



Modular Payloads
- EW
- ISR
- Command and Control
- Airborne Moving Target Indicator
- Ground Moving Target Indicator
- Information Integration
- AAR-R & T
- Airlift
- Humanitarian Assistance

MQ-Lc

Modular Payloads
- EW
- ISR
- Command and Control
- Airborne Moving Target Indicator
- Ground Moving Target Indicator
- Information Integration
- AAR-R & T
- Airlift
- Humanitarian Assistance
- Strategic Attack
- Global Strike
- CAS
- Air Mobility
- Airlift

Now → Future

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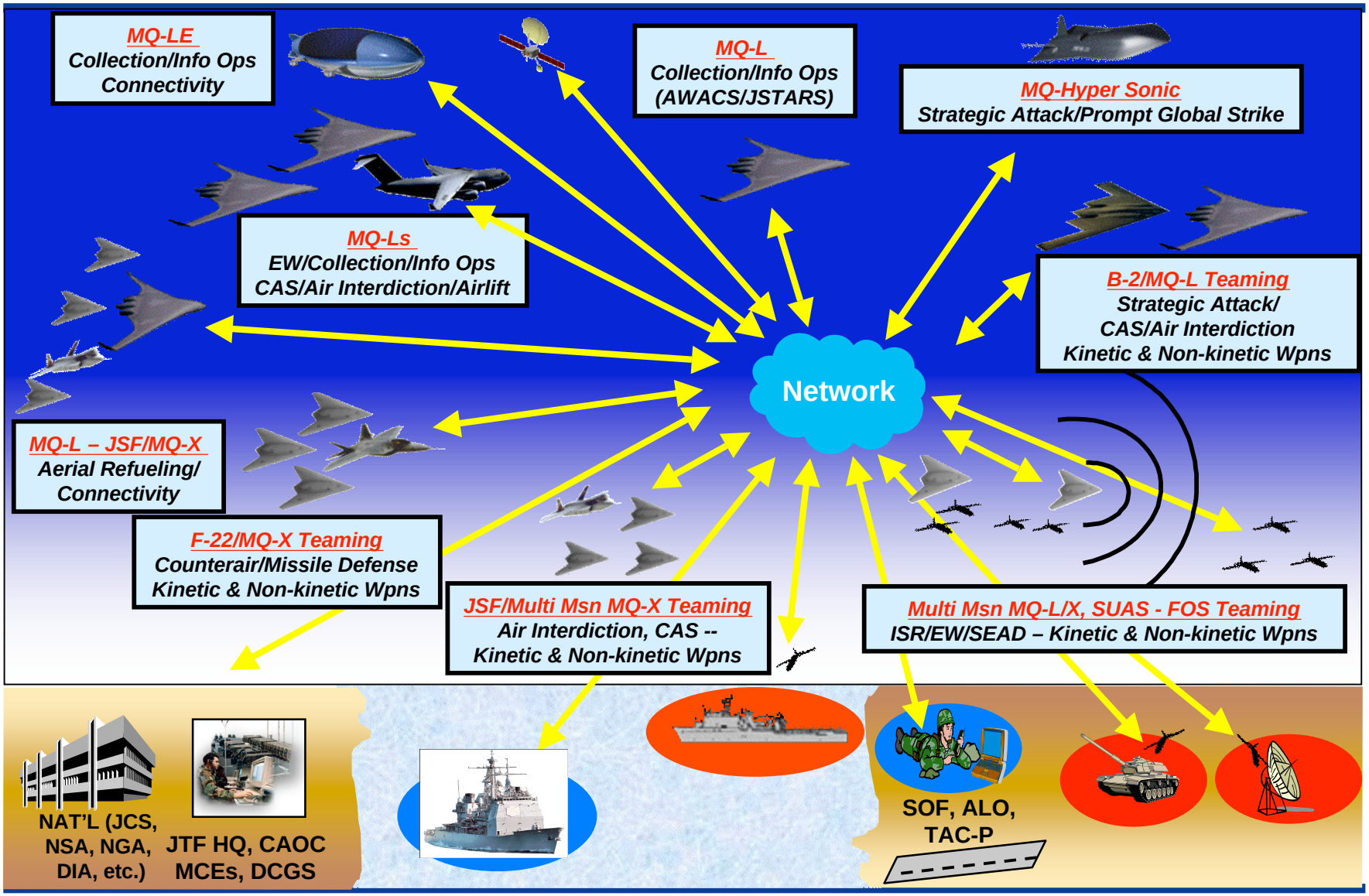
Connectivity and Teaming
Future



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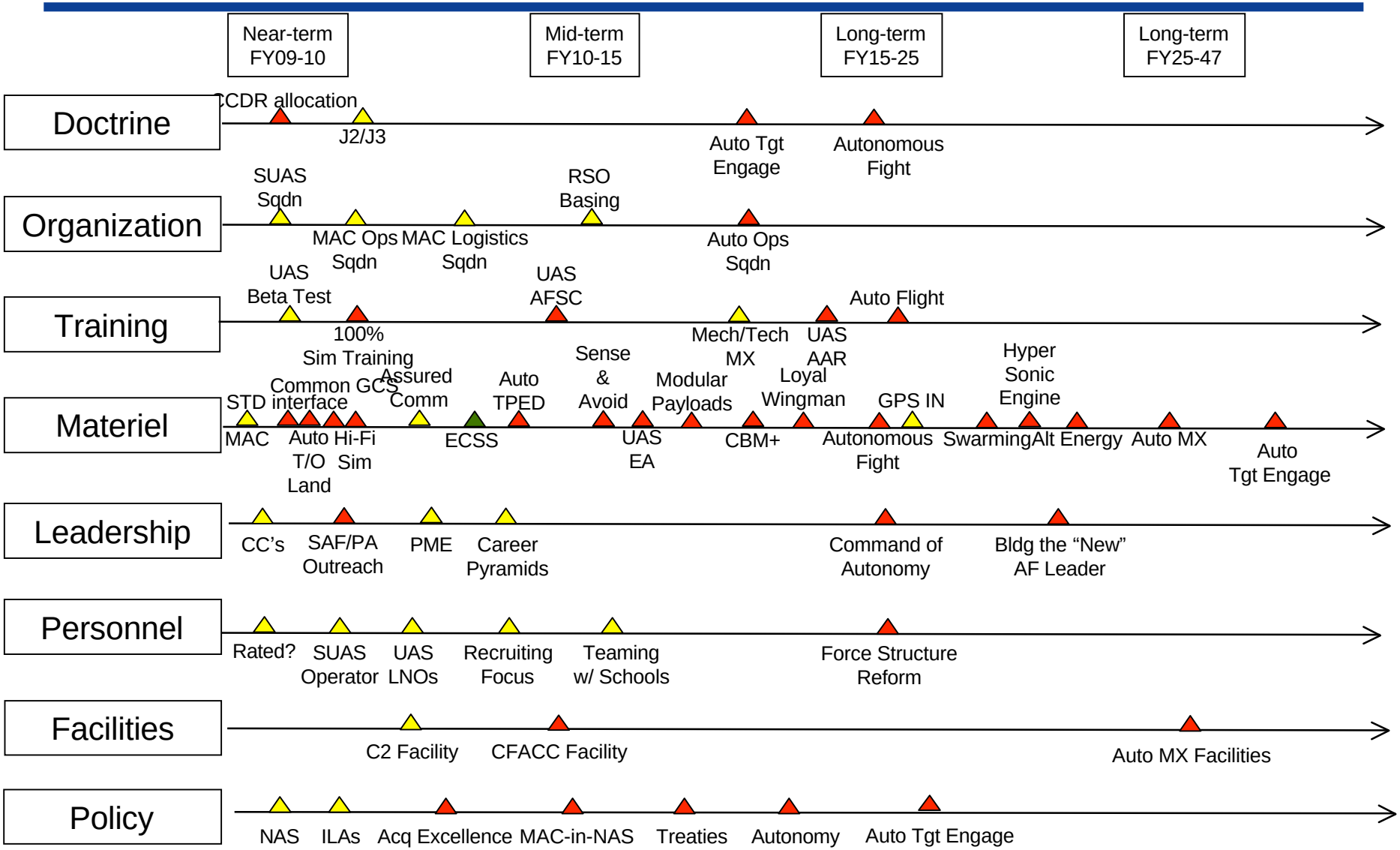
Action Synchronization



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AF UAS Flight Plan Vision

- **An Air Force where unmanned aircraft systems are considered as viable alternatives to traditionally manned platforms**
- **An Air Force that harnesses increasingly automated, modular and sustainable systems resulting in a leaner, more adaptable, tailorable, and efficient force that maximizes combat capabilities to the Joint Force**
- **An Air Force that teams with the other Services, our allies, academia and industry to capitalize on the unique unmanned aircraft attributes of persistence, connectivity, flexibility, autonomy, and efficiency**

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AF UAS Task Force

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